

Having described the invention, the following is claimed:

1. A sensor for detecting hydrogen peroxide, comprising an element exhibiting piezoelectric properties having a metal-oxide-containing coating, said metal-oxide having a divalent or tetravalent state.
2. A sensor as defined in claim 1, wherein said metal-oxide is selected from the group consisting of lead dioxide (PbO_2), silver oxide (AgO) and manganese dioxide (MnO_2).
3. A sensor as defined in claim 2, wherein said metal oxide is lead dioxide (PbO_2).
4. A sensor as defined in claim 3, wherein said element is a crystal that lacks a center of symmetry.
5. A sensor as defined in claim 4, wherein said crystal is a quartz crystal.
6. A sensor as defined in claim 5 having a resonant frequency of 5 MHz or 10 MHz.
7. A sensor for detecting hydrogen peroxide, comprising a piezoelectric crystal having a lead dioxide (PbO_2)-containing coating.
8. A sensor as defined in claim 7, wherein said crystal is a quartz crystal.
9. A sensor as defined in claim 8, having a resonant frequency of 5 MHz or 10 MHz.
10. A sensor as defined in claim 1, wherein said coating includes a single valency oxide state.
11. A sensor for detecting hydrogen peroxide, comprising:
 - a substrate exhibiting piezoelectric properties having first and second major surfaces;
 - a first electrode connected to said first major surface and a second electrode connected to said second major surface; and
 - a layer of a material on at least one of said first and second major surfaces, said material operable to change a frequency of said sensor when exposed to hydrogen peroxide.
12. A sensor as defined in claim 11 for sensing vaporized hydrogen peroxide.

13. A sensor as defined in claim 11, wherein said substrate is selected from the group consisting of a quartz crystal, Rochelle salt, barium titanate, tourmaline, polyvinylidene fluoride and crystals that lack a center of symmetry.

14. A sensor as defined in claim 13, wherein said substrate is a quartz crystal.

15. A sensor as defined in claim 11, wherein said layer of material contains a metal oxide having a divalent or tetravalent state.

16. A sensor as defined in claim 15, wherein said metal oxide is lead dioxide (PbO₂).

17. A method of determining the presence of a sterilant in a region of a decontamination system having a chamber defining the region and a circulation system for supplying the sterilant to the region, comprising the steps of:

providing in said region an element having piezoelectric properties with a metal oxide coating having a divalent or tetravalent state;

determining a baseline frequency of oscillation for said element in the absence of the sterilant;

determining a sensed frequency of oscillation for said element when exposed to the sterilant in said region; and

determining the concentration of the sterilant in said region based upon the difference between said sensed frequency and said baseline frequency.

18. A method as defined in claim 17, wherein said sterilant includes hydrogen peroxide.

19. A method as defined in claim 18, wherein said hydrogen peroxide is vaporized.

20. A method as defined in claim 19, wherein said sterilant includes water vapor.

21. A method as defined in claim 18, wherein said metal oxide is lead oxide.

22. A method as defined in claim 19, wherein said element is a quartz crystal.

23. A system for the deactivation of bio-contamination, comprising:
a system for moving a sterilant through a space;

a piezoelectric device that supports a material that interacts with said sterilant, said piezoelectric device having a frequency that changes in response to the presence of said sterilant; and

a controller having data stored therein relating to said piezoelectric device, said data relating a frequency of said piezoelectric device to a concentration of said sterilant.

24. A system as defined in claim 23, wherein said sterilant includes hydrogen peroxide.

25. A system as defined in claim 24, wherein said hydrogen peroxide is vaporized.

26. A system as defined in claim 25, wherein said sterilant includes water vapor.

27. A system as defined in claim 23, wherein said piezoelectric device is a crystal that lacks a center of symmetry.

28. A system as defined in claim 27, wherein said crystal is a quartz crystal.

29. A system as defined in claim 28 having a resonant frequency of 5 MHz or 10 MHz.

30. A system as defined in claim 23, wherein said material contains a metal oxide having a divalent or tetravalent state.

31. A system as defined in claim 30, wherein said metal oxide is lead dioxide (PbO₂)